

Remarks

Claims 1-20 are pending in the application. Claims 1-12 and 14-20 were rejected and claim 13 was objected to. By this Amendment, claim 1 has been amended. Reconsideration of the claims is respectfully requested. No new matter has been added.

Rejection Under 35 U.S.C. § 103

Claims 1-12 and 14-20 were rejected under § 103(a) as being unpatentable over U.S. Patent No. 6,430,947 issued to Bascober (hereinafter “Bascober ‘947”) in view of U.S. Patent No. 5,481,884 issued to Scoccia (hereinafter “Scoccia ‘884”). Independent claims 1, 10, and 18 and their respective dependent claims are discussed separately below.

A *prima facie* case has not been established for the rejection of claim 1. Claim 1 recites a system for assessing a refrigerant charge level in a vehicle air conditioning system. The system comprises “a first sensor for providing a cooled air temperature signal; a second sensor for providing an ambient air temperature signal; a third sensor for providing an ambient air humidity signal; a fourth sensor for providing a compressor cycling signal; a processing module for determining a refrigerant charge level as a function of signals from the first, second, third, and fourth sensors; and an indicator for indicating that the level of refrigerant charge is acceptable if the refrigerant charge level is greater than a threshold value.”

Neither Bascober ‘947 nor Scoccia ‘884, either alone or in any combination, discloses or suggests the limitations of claim 1. In the Office Action, the Examiner admitted that Bascober ‘947 failed to disclose a fourth sensor for providing a compressor cycling signal and an indicator for indicating that the level of refrigerant charge is acceptable if the refrigerant charge level is greater than a threshold value. Scoccia ‘884 does not cure the deficiencies of Bascober ‘947. For example, Scoccia ‘884 does not disclose or remotely suggest a fourth sensor for providing a compressor cycling signal, let alone determining a refrigerant charge level based on such a signal. In the Office Action, the Examiner pointed to column 1, lines 20-27 of Scoccia ‘884 for support (see Office Action, page 3). The passage cited by the

Examiner merely states that “a lower refrigerant charge typically causes disengagement of the cycling clutch to prevent compressor damage.” In other words, disengagement of a compressor clutch is a result of a low refrigerant charge, but is not related to the determination of a refrigerant charge level as claimed. Moreover, this passage, like the rest of Scoccia ‘884, does not disclose or suggest a fourth sensor for providing a compressor cycling signal as recited in claim 1. For these reasons, a *prima facie* case has not been established for the rejection of claim 1 and Applicants respectfully request that this rejection be withdrawn. Since claims 2-9 depend on claim 1, a *prima facie* case has not been established for the rejection of these claims for the same reasons.

Even if a proper rejection was established for the rejection of claim 1, a *prima facie* case has not been established for the rejection of claim 2. Claim 2 recites “a second indicator for indicating that the level of refrigerant is unacceptable if the refrigerant charge level is less than the threshold value.” Neither Bascober ‘947 nor Scoccia ‘884, either alone or in any combination, discloses or suggests the limitations of claim 2. Moreover, the Examiner has provided no arguments directed to the limitations of claim 2. Thus, Applicants respectfully request that this rejection be withdrawn.

A *prima facie* case has not been established for the rejection of claim 5. Claim 5 recites that “the first, second, and third sensors are not disposed on the vehicle.” Neither Bascober ‘947 nor Scoccia ‘884, either alone or in any combination, discloses or suggests the limitations of claim 5. Indeed, Bascober ‘947 and Scoccia ‘884 teach away from first, second, and third sensors are not disposed on the vehicle. For example, Bascober ‘947 repeatedly stresses that it applicable only to mobile air conditioning systems (for example see column 1, lines 11 and 66, and column 3 lines 43-45) to address issues associated with air flow and other variables that are “a function of vehicle speed” and “additional variables that are controlled by instantaneous vehicle travel requirements” (see column 1, lines 32-43). To address these issues and variables, the refrigerant system and all sensors in Bascober ‘947 must be disposed on a vehicle to sense conditions that are not present in stationary systems (see column 1, lines 28-31). Indeed, the system in Bascober ‘947 would not function if all

components and sensors were not disposed on a vehicle because real time monitoring and control is needed while the vehicle is in motion at high vehicle speeds with high condenser air flow (see column 1, lines 47-50). As such, the location of sensors in Bascobert '947 cannot properly be considered mere design choice by anyone skilled in the art.

A prima facie case has not been established for the rejection of claim 10. Claim 10 recites "a method of assessing a level of refrigerant charge in a vehicle air conditioning system with a refrigerant assessment system, the vehicle air conditioning system including a refrigerant subsystem having a compressor adapted to circulate a refrigerant and an air handling subsystem for providing air cooled by the refrigerant subsystem to a vehicle passenger compartment, and the refrigerant assessment system including a control module adapted to receive a first signal indicative of a cooled air temperature, a second signal indicative of an ambient air temperature, a third signal indicative of an ambient air humidity, and a fourth signal indicative of cycling of the compressor between engaged and disengaged states, the method comprising the steps of: calculating as a function of the first, second, third, and fourth signals a refrigerant charge value indicative of an amount of refrigerant in the vehicle air conditioning system; determining whether the refrigerant charge value exceeds a threshold value indicative of a desired refrigerant charge amount; and signaling that the level of refrigerant is acceptable if the refrigerant charge value is greater than the threshold value.

Neither Bascobert '947 nor Scoccia '884, either alone or in any combination, discloses or suggests the limitations of claim 10. For example, Bascobert '947 fails to disclose or suggest any signal indicative of cycling of a compressor between engaged and disengaged states, let alone the calculation of a refrigeration charge value based on such a signal. Scoccia '884 does not cure the deficiencies of Bascobert '947 since it too does not disclose or remotely suggest any signal indicative of cycling of a compressor between engaged and disengaged states or the calculation of a refrigerant charge value based on such a signal. In the Office Action, the Examiner pointed to column 1, lines 20-27 of Scoccia '884 for support (via reference to claim 1). The passage cited by the Examiner merely states that "a lower refrigerant charge typically causes disengagement of the cycling clutch to prevent compressor damage." In other

words, disengagement of a compressor clutch is the result of a low refrigerant charge and is not related to the calculation of a refrigerant charge value as claimed. Indeed, there is absolutely no disclosure or suggestion in Scoccia '884 of calculating a refrigerant charge value as a function of clutch engagement. For these reasons, a *prima facie* case has not been established for the rejection of claim 10 and Applicants respectfully request that this rejection be withdrawn. Since claims 11, 12, and 14-17 depend on claim 10, *prima facie* case has not been established for the rejection of these claims for the same reasons.

A *prima facie* case has not been established for the rejection of claim 12. Claim 12 recites that "the first and fourth signals are sampled more frequently than the second and third signals." In the Office Action, the Examiner admitted that neither Bascobert '947 nor Scoccia '884, either alone or in any combination, recites or suggests the limitations of claim 12 (see Office Action, page 4). Contrary to the Examiner's contentions it is not well known that ambient temperature and humidity change less frequently than compressor cycling and cooled air temperature. Indeed, the opposite is true in a myriad of vehicle operating conditions, such as during elevation changes, exit or entry of a vehicle from and enclosed area, etc. Applicants challenge the Examiner's arguments as (1) not constituting proper Official Notice and (2) not properly based on common knowledge. Documentary evidence must now be provided in the next Office Action if this rejection is to be maintained in accordance with § MPEP 2144.03.

A *prima facie* case has not been established for the rejection of claim 14. Claim 14 recites that "the first signal indicative of a cooled air temperature is provided by a temperature sensor disposed near a vent aperture in the air handling subsystem." In the Office Action, the Examiner admitted that neither Bascobert '947 nor Scoccia '884, either alone or in any combination, recite the combination of claim 20.

"They [Bascobert '947 nor Scoccia '884] fail to teach the temperature is indicative of a cooled air temperature by a temperature sensor disposed near a vent aperture in an air

conditioning subsystem.” (Office Action, page 4.)

The cited references do not teach or suggest the limitations of claim 14, which is a basic requirement of a *prima facie* case of obviousness. Since neither Bascobert ‘947 nor Scoccia ‘884 teaches or suggests the limitations of claim 14 and the Examiner has admitted this deficiency, a *prima facie* case has not been established and Applicants request that the rejection of claim 14 be withdrawn.

A *prima facie* case has not been established for the rejection of claim 18. Claim 18 recites a “method for assessing a refrigerant charge level in an air conditioning system disposed in a vehicle, the vehicle having an engine, a compressor having a clutch and adapted to be driven by the engine and circulate a refrigerant to provide a cooling effect when the clutch is engaged, a duct for providing air cooled by the refrigerant to a vehicle passenger compartment, a first signal indicative of a cooled air temperature, a second signal indicative of an ambient air temperature, a third signal indicative of an ambient air humidity, and a fourth signal indicative of engagement of the clutch, the method comprising the steps of: calculating as a function of the first, second, third, and fourth signals a refrigerant charge value indicative of an amount of refrigerant in the air conditioning system; determining whether the refrigerant charge value exceeds a threshold value indicative of a desired amount of refrigerant in the air conditioning system; and signaling that the level of refrigerant is acceptable if the threshold value is exceeded.”

Neither Bascobert ‘947 nor Scoccia ‘884, either alone or in any combination, discloses or suggests the limitations of claim 18. For example, Bascobert ‘947 fails to disclose or suggest any signal indicative of engagement of a clutch, let alone the calculation of a refrigeration charge value based on such a signal. Scoccia ‘884 does not cure the deficiencies of Bascobert ‘947 since it too does not disclose or remotely suggest any signal indicative of engagement of a clutch or calculation of a refrigerant charge value indicative of an amount of refrigerant in the air conditioning system based on such a signal. In the Office Action, the Examiner made reference to column 1, lines 20-27 of Scoccia ‘884 for support (via reference

to claims 1 and 10). The passage cited by the Examiner merely states that “a lower refrigerant charge typically causes disengagement of the cycling clutch to prevent compressor damage.” In other words, disengagement of a compressor clutch is the result of a low refrigerant charge and is not related to the calculation of a refrigerant charge value as claimed. Indeed, there is absolutely no disclosure or suggestion in Scoccia ‘884 of calculating a refrigerant charge value as a function of clutch engagement. For these reasons, a *prima facie* case has not been established for the rejection of claim 18 and Applicants respectfully request that this rejection be withdrawn. Since claims 19 and 20 depend on claim 18, a *prima facie* case has not been established for the rejection of these claims for the same reasons.

A *prima facie* case has not been established for the rejection of claim 20. Claim 20 recites that the second and third signals are sampled less frequently than the first and fourth signals. Neither Bascobert ‘947 nor Scoccia ‘884, either alone or in any combination, recite the combination of claim 20. In the Office Action, the Examiner presented no arguments regarding the specific limitations of claim 20, which alone is sufficient to negate the establishment of a *prima facie* case. Moreover, the cited references do not teach or suggest these claim limitations, which is a basic requirement of a *prima facie* case of obviousness. Applicants also challenge the Examiner’s arguments as (1) not constituting proper Official Notice and (2) not properly based on common knowledge. Documentary evidence must now be provided in the next Office Action if this rejection is to be maintained in accordance with § MPEP 2144.03. Thus, Applicants request that the rejection of claim 20 be withdrawn.

Conclusion

Applicants have made a genuine effort to respond to the Examiner's objections and rejections in advancing the prosecution of this case. Applicants believe all formal and substantive requirements for patentability have been met and that this case is in condition for allowance, which action is respectfully requested.

Respectfully submitted,

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